

APPENDIX A

Claims on Appeal

1. A method of providing a silicon micro-needle, the micro-needle having a base adjoining a silicon substrate, a tip remote from said base, and a duct passing from said base to said tip, the method comprising:
 - a. providing a duct in said silicon substrate; and subsequently
 - b. selectively removing the substrate from around the duct to provide a micro-needle coincident with the duct.

~~2~~ ~~3~~ A method according to claim 1 wherein a mask is lithographically provided on a substrate of the first material prior to the formation of the duct.

~~3~~ ~~4~~ A method according to claim 3 wherein the mask is used to provide the duct which is fabricated by any one of the following techniques: plasma enhanced etching, laser ablation, light assisted anodisation, ion beam milling, focused ion beam milling.

~~4~~ ~~5~~ A method according to claim 1 wherein the micro-needle is bounded by planes of the first material which have a low etch rate.

~~5~~ ~~6~~ A method according to claim 5 wherein an anisotropic etch is used to selectively remove the first material.

6 7. A method according to claim 1 wherein the first material is removed by any one of the following methods: focused ion beam milling, etching combined with a domed resist mask.

17 8. A method of providing a silicon micro-needle, the micro-needle having a base adjoining a silicon substrate, a tip remote from said base, and a duct passing from said base to said tip, the method comprising:

- a. selectively removing the silicon substrate to provide a micro-needle; and subsequently
- b. providing a duct coincident with the micro-needle.

18 10. A method according to claim 8 wherein the micro-needle is bounded by planes of the first material which have a low etch rate.

19 11. A method according to claim 10 wherein an anisotropic etch is used to selectively remove the first material.

20 12. A method according to claims 8 wherein said micro-needle is formed by any one of the following techniques: focused ion beam milling, etching combined with a domed resist mask.

21 13: A method according to claim 8 wherein once the micro-needle has been formed a planar surface is provided covering the micro-needle.

22 14: A method according to claim 13 wherein the duct is provided by lithographic processes performed on the planar surface.

23 15: A method according to claim 14 wherein once the duct has been provided the planar surface is removed.

24 16: A method according to claim 1 wherein the method is arranged to provide a micro-needle whose outer walls are inclined to a plane that is perpendicular to the substrate to which the micro-needles are adjacent.

25 17: A method of providing a micro-needle on the surface of a first material, the micro-needle having a base adjoining the first material, a tip remote from said base, and a duct passing from said base to said tip, the method comprising:

- a. providing a duct in said first material,
- b. lining said duct with a second material, and

c. removing said first material from around said second material leaving a micro-needle fabricated from said second material attached to said first material and upstanding therefrom.

25 19. A method according to claim 17 wherein the second material is any one of the following materials: SiO₂, a metal, ceramic, a polymer, a semi-conductor.

24 20. A method according to claim 17 wherein a portion of the second material covering the inside surface of the duct is removed before or whilst the first material is removed from around the second material.

21 21. A method according to claim 17 wherein the first material is removed by etching.

22 22. A method according to claim 17 wherein a mask is lithographically provided on a substrate of the first material prior to the formation of the duct.

23 23. A method according to claim 22 wherein the mask is subsequently used to control fabrication of the duct.

31 24. A method according to claim 17 wherein the duct is fabricated using any one of the following processes: plasma based etching, laser ablation, focused ion beam milling, light assisted anodisation of silicon.

31 25. A method according to claim 17 wherein the second material is provided by any one of the following processes: oxidiation, deposition.

32 26. A method according to claim 17 wherein the micro-needle is shaped by removing a portion of the second material.

33 27. A method according to claim 1 in which once the micro-needle has been created the method further includes linking the duct to a reservoir.

9 28. A method according to claim 27 in which a portion of the first material is removed from a side opposite a side of the first material where the micro-needle has been fabricated.

10 29. A method according to claim 27 in which the first material is attached to a second piece of material.

130. A method according to claim 29 in which the second piece of material has a channel which connects to the duct and links the duct to a reservoir.

131. A method according to claim 29 in which the first material has a channel which connects to the duct and links the duct to a reservoir.

132. A method according to claim 29 in which the two pieces of material are fabricated from same material.

133. A method according to claim 1 in which the micro-projection is fabricated substantially normal to the surface of the first material.

134. A method according to claim 1 wherein a surface region of the micro-needle is porosified after the needle has been fabricated.

135. A method according to claim 34 wherein the porosification is provided by one of the following techniques: electrochemical anodisation, or immersing the structure in a stain etching solution.